

Waste Management Plan for the V-Tanks, TSF-09/18, at Waste Area Group 1, Operable Unit 1-10, Remedial Action

1. PURPOSE AND OBJECTIVES

This waste management plan (WMP) is designed to support the Group 2 activities outlined in the Remedial Design/Remedial Action (RD/RA) Work Plan for Test Area North (TAN), Waste Area Group (WAG) 1, Operable Unit (OU) 1-10 (DOE-ID 2001) at the Idaho National Engineering and Environmental Laboratory (INEEL).

This remedial action is being performed to implement the soil and tank removal, ex situ treatment of tank contents, and disposal action identified as the selected remedy in the Final Record of Decision (ROD) for OU 1-10 (DOE-ID 1999a). The activities are being performed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as implemented by the Federal Facilities Agreement and Consent Order (FFA/CO). This WMP identifies the types and the volumes (when possible) of wastes associated with this remedial action, discusses waste minimization and segregation activities, and provides requirements for waste storage, transportation, treatment, and ultimate disposal.

Group 2 consists of the Intermediate-Level Waste Disposal System comprising (a) the Technical Support Facility (TSF)-09, which includes the three underground storage tanks (USTs) V-1, V-2, and V-3, and (b) the Contaminated Tank southeast of Tank V-3 (TSF-18), an underground storage tank known as V-9 and an aboveground concrete sand filter. Collectively, these tanks are known as the V-Tanks. Group 2 also includes ancillary piping, equipment, and contaminated soil from each area.

This WMP addresses:

- The waste streams that will be generated from the implementation of the remedial action
- Interim storage strategies for sludge at the TAN-607 Warm Shop: also known as the Interim Sludge Storage Facility (ISSF)
- Existing waste streams that are associated with TSF-09 and TSF-18
- The removal and transfer of several non-CERCLA components that fall under the Voluntary Consent Order (VCO)

The remediation activities for the V-Tanks will occur both within the area of contamination (AOC) surrounding the TSF-09 and TSF-18 sites and at designated waste storage areas identified and further discussed later in this plan. The majority of waste generation is anticipated to occur during implementation of the remedial action work task activities listed below:

- Mobilization
- Waste packaging and handling
- Radiological control

- Transfer of sludge to interim storage
- Tank contents removal
- Interim demobilization
- Sludge drum filling
- Remedial action confirmation sampling
- Liquid treatment, packaging, and stabilization
- Backfill and demobilization
- Excavation and removal of sand filter, ancillary piping, V-tanks, and TAN-1704 valve pit
- Inspections
- Decontamination

2. SITE BACKGROUND

As a supporting document to the Group 2 RD/RA Work Plan (RD/RA WP), this WMP provides only a brief background of TSF-09 and TSF-18, as that information pertains to supporting the waste identification and volume classifications presented in Section 3. Detailed background information for TSF-09 and TSF-18 is contained in the Group 2 RD/RA WP (DOE-ID 2001).

2.1 TSF-09 and TSF-18

The TSF-09 and TSF-18 sites, shown in Figure 1, are situated in an open area east of TAN-616 and north of TAN-607, and involve ancillary piping in the vicinity of the tank areas. Installed in the early 1950s, the four underground storage tanks (USTs) and associated pipes at TSF-09 and TSF-18 were part of the system designed to collect the following materials for treatment:

- Radioactive liquid effluents generated in the hot cells, laboratories, and decontamination facilities at TAN
- Waste from the Initial Engine Test (IET) facility.

The TSF-09 site consists of three 37,860-L (10,000-gal) USTs referred to as Tank V-1, V-2, and V-3. These tanks are 3 m (10 ft) in diameter and 5.5 m (18 ft) in length.

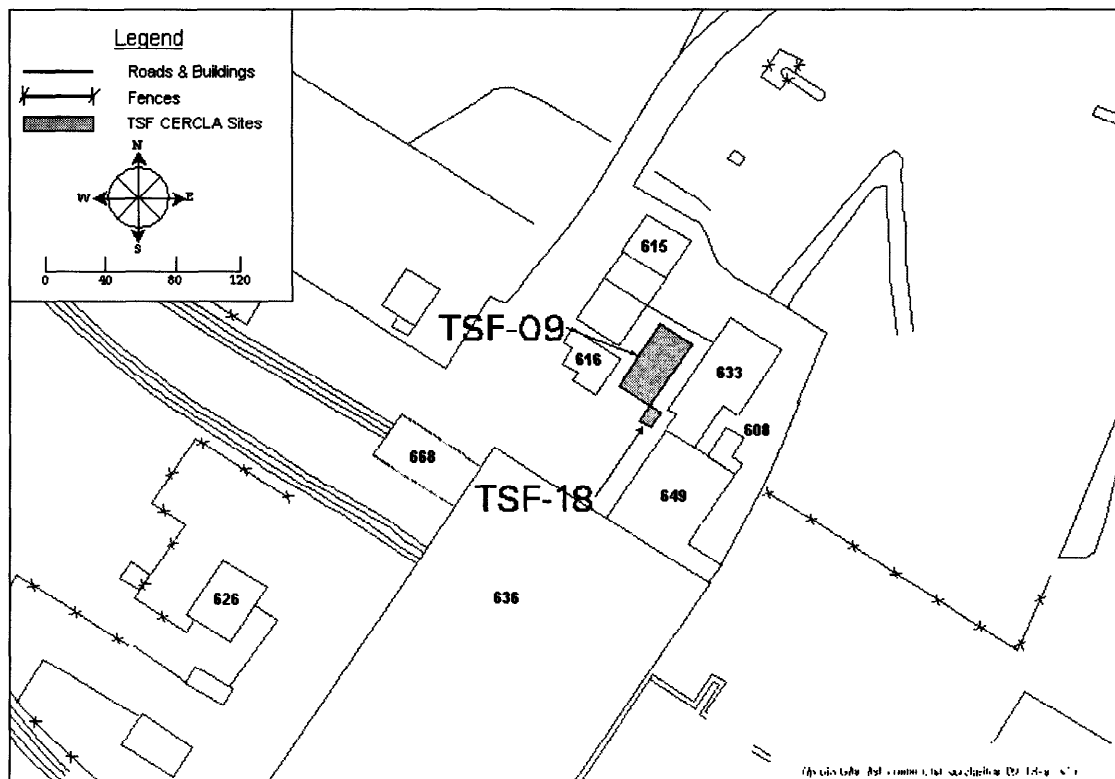


Figure 1. OU 1-10: TSF-09 and TSF-18 site.

The TSF-18 site includes one 1,514-L (400-gal) conical UST, Tank V-9, and associated pipes located approximately 2.1 m (7 ft) below ground surface. The tank is approximately 1.06 m (42 in.) in diameter in the center and extends roughly 2.1 m (7 ft) from the top of the tank to the tip of the cone. During the waste disposal system operations, waste transfers to and from the tanks caused spills that contaminated the surface and subsurface around and north of TSF-18. In addition to Tank V-9, TSF-18 also includes an aboveground sand filter that is believed to have been used to remove particulates from Tank V-9 effluent. The concrete box containing the sand filter has outer dimensions of approximately 1.5 m (5 ft.) wide by 1 m (3 ft.) deep by 1 m (3 ft.) high; the box walls are 10 to 15 cm (4 to 6 in.) thick. The anecdotal history of the structure indicates the filter was only used for 1 day in 1970 before it became plugged.

Low-level radioactive wastewater from the TSF facilities was transferred to Tank V-9 via the TAN-1704 Valve Pit, which operated from 1953 to the late 1980s to receive wastewater from the original TSF facilities. This valve pit, its associated influent lines, and additional piping will be removed under the RD/RA WP and managed by the Voluntary Consent Order (VCO) program in accordance with Resource Conservation and Recovery Act (RCRA)-regulated VCO requirements.

2.1.1 System Description

Figure 2 depicts the sources of waste that were likely contained in Tank V-9 and Tanks V-1, V-2, and V-3. The indicated subsurface influent and effluent lines associated with the tanks are meant to be representative, rather than technically accurate. The RD/RA WP design drawing, "Pipe Removal Plan" (Appendix A, Design Drawings, sheet 7 of 19), presents a more detailed illustration.

As shown in Figure 2, Tank V-9 received wastewater from several TAN sources via the TAN-1704 valve pit, which delivered these wastes via two subsurface influent lines. Those lines were cut and capped within the valve pit in 1991. The valve pit received wastewater from four influent lines:

- A line serving the TAN-616 evaporator pit sump and pump room sump
- TAN-607 laboratory drain
- TAN-607 Warm/Hot Shop
- TSF-21 valve pit #2.

One subsurface effluent line discharges overflow from Tank V-9 to Tanks V-1, V-2, and V-3. As the wastes delivered to Tank V-9 were historically not well documented, some uncertainty exists regarding the exact source of wastes.

Tanks V-1, V-2, and V-3 are each equipped with three subsurface influent lines and one subsurface effluent line. One influent line piped radioactive wastewater from V-9 to the TSF-09 tanks. A second delivered sodium hydroxide (NaOH) from the caustic storage tank (V-4) to neutralize the waste. (The caustic storage tank did not receive any wastes from the V-Tank system, and it will not be managed under this WMP.) A third line delivered influent from the TAN-616 evaporator operating pump room to the TSF-09 tanks. A single effluent line on each tank is routed to the TAN-616 pump room and evaporator system. Tank V-3 is identified as having an additional inlet line from the TAN-615 east and west sumps.

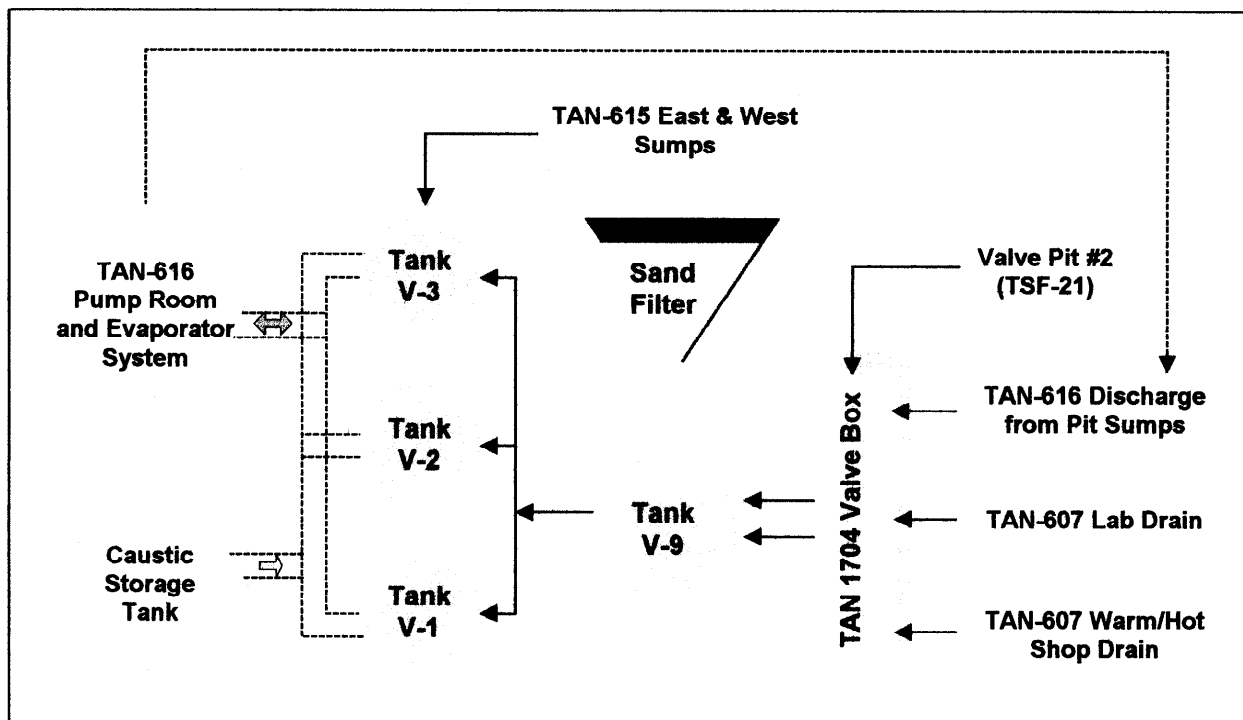


Figure 2. TSF-09 and TSF-18 waste distribution.

2.1.2 Tanks and Associated Piping, Sand Filter, Valve Box, and Contaminated Soil Summary

Table 1 presents a brief summary of the information provided in the RD/RA WP (DOE-ID 2001) that supports waste stream identification, classification, and estimated volumes.

Table 1. Historical Summary of Sites TSF-09 and TSF-18 and related components.

Waste Source	Historical Background
Tank V-9 and ancillary piping	<ul style="list-style-type: none"> Approximately 750 to 950 L (200 to 250 gal) of sludge and 265 L (70 gal) of liquid remain in the conical tank^a, although the volume located behind the baffle is not known. Blackmore (1998) estimated the total tank volume at 1,216 L (320 gal). Due to the high concentration of fissile materials in the tank, a criticality evaluation was conducted in 1998. The evaluation recommended that additional sampling be conducted to adequately assess criticality issues. Eight samples were collected from TAN V-9 in April 2001; three of those samples were collected from behind the baffle. The data evaluation resulting from that sampling effort is contained in Appendix G of the RD/RA Work Plan. The liquid and sludge in V-9 are contaminated with radionuclides (gamma, alpha, and beta emitting), and metals and organic contaminants classified as RCRA hazardous wastes. Past sampling data for sludge samples from V-9 indicate PCB concentrations exceed 50 mg/kg.^b

Table 1. (continued.)

Waste Source	Historical Background
Tanks V-1, V-2, and V-3 and ancillary piping	<ul style="list-style-type: none"> The volume of solids in V-1 and V-2 is approximately 1,965 L (520 gal) per tank.^b V-3 has an estimated 2,465 L (652 gal) of sludge.^b Estimated liquid volumes for Tanks V-1, V-2, and V-3 are 4,400 L (1,164 gal), 4,067 L (1,076 gal) and 28,951 L (7,648 gal) of liquid respectively.^b The liquid and sludge in V-1, V-2, and V-3 are contaminated with radionuclides (gamma, alpha, and beta emitting), and metals and organic contaminants that are classified as RCRA hazardous wastes. Past sampling data indicates sludge samples exceed 50 mg/kg for polychlorinated biphenyls (PCBs) in V-1, V-2, and V-3.^b
Contaminated Soil	<ul style="list-style-type: none"> During the waste disposal system operations, waste transfers to and from the tanks resulted in spills that contaminated the surface and subsurface soil. Although not fully defined, the horizontal extent is estimated to encompass an area of 15.2 × 24.4 m (50 × 80 ft). Vertical extent is known to extend to a depth of 6.7 m (22 ft). Surface and subsurface soil samples indicated soils are contaminated with radionuclides (elevated levels of beta activity, Cs-137, Co-60, and Sr-90). Analytical results identify that volatile organic compounds (VOCs) and toxicity characteristic leaching procedure (TCLP) metals were below RCRA regulated levels for TCLP and land disposal restriction (LDR) concentrations.^b
Sand Filter	<ul style="list-style-type: none"> The filter is an aboveground concrete box containing 19 L (5 gal) of material. The outer dimensions of the concrete box are approximately 1.5 m (5 ft) wide by 1 m (3 ft) deep by 1 m (3 ft) high. The box resides on a concrete pad slightly wider than these outside dimensions. The concrete walls are 10 to 15 cm (4 to 6 in.) thick. Results from the sand filter contents sampling from 1997 indicate the presence of PCBs exceeding 50 mg/kg and gamma, alpha, and beta emitting radionuclides (Co-60, Sr-90, Tc-99, Cs-137, U-234, and U-235). Gross alpha and beta were 1.54×10^{-4} pCi/g and 9.73×10^{-5} pCi/g respectively.
TAN-1704 Valve Pit, associated piping and lines	<ul style="list-style-type: none"> The internal dimensions of the concrete valve pit are 1.5 m (5 ft) by 1.6 m (5.3 ft) by 2.9 m (9.5 ft) in depth. The calculated internal volume of the valve pit is 7,170 L (1,894 gal). Approximately 0.3 m of the liquid (760 L) was noted at the base of the valve pit.^b The liquid in the TAN-1704 Valve Pit was sampled for radionuclides, PCBs, and TCLP inorganics, volatile organic compounds (VOCs), and semi-VOCs. Trace values were reported for trichloroethene and 2-hexanone. Alpha, beta, and gamma emitting radionuclides were present.^b
a. Remedial Investigation/Feasibility Study (DOE-ID 1997).	
b. Remedial Design/Remedial Action Work Plan (DOE-ID 2001).	

3. WASTE IDENTIFICATION

Table 2 summarizes the six types of wastes anticipated to be generated from the various activities associated with the OU 1-10 Group 2 Remedial Action. The expectation that these wastes could be generated during the remedial action is based on available process knowledge, analytical data, and waste profiles.

Table 2. Definitions of potential waste types that may be encountered.

Type	Definition
Hazardous Waste (HW)	Waste that consists of a hazardous component subject to RCRA.
Low-level Waste (LLW)	Radioactive waste that is not high-level radioactive waste, spent nuclear fuel, transuranic waste, and byproduct material (as defined in Section 11e. [2] of the Atomic Energy Act of 1954, as amended), or naturally occurring radioactive material.
Mixed Low-Level Waste (MLLW)	Waste that contains both radioactive waste subject to the Atomic Energy Act of 1954, as amended, and a hazardous component subject to RCRA.
MLLW with PCBs ≥ 50 ppm	Low-level waste containing polychlorinated biphenyls (PCBs) in a concentration of greater than 50 parts per million that shall be managed in accordance with the requirements derived from the Toxic Substances Control Act, and also consisting of a hazardous component subject to RCRA.
Nonconditional Industrial Waste (IW)	Wastes including cafeteria waste, paper, sweepings, and office waste.
Conditional Industrial Waste (CIW)	Wastes including non-training-related personal protective equipment, petroleum-contaminated material such as soil, sand, gravel, or other earthen material.

3.1 Currently Managed Wastes

Wastes currently managed as CERCLA remediation wastes at TAN that will be managed under this WMP are listed in Table 3.

3.2 Wastes to be Generated

A waste stream summary detailing the wastes anticipated from the different remedial activities and the storage strategies currently planned for the wastes appears in Table 4.

Table 3. Currently Managed CERCLA Waste included in the WMP

Waste Stream ID	Waste Stream Description	Waste Type	Estimated Volume	Storage Location	Planned Disposal
2921	V-Tank altered and unaltered sample returns	MLLW with PCBs	83 ft ³	Waste Reduction Operations Complex (WROC) and TAN	ATG or another TSCA/RCRA compliant Treatment Storage Disposal Facility (TSDF)
1971	V-Tank analysis residues	MLLW with PCBs	126 gal	WROC	ATG or another TSCA/RCRA compliant Treatment Storage Disposal Facility (TSDF)
1977L	PPE and debris from V-Tank and TSF-26 soils	MLLW	220 gal	TAN	INEEL CERCLA Storage Facility (ICDF) or Envirocare
2868 N	WAG 1 V-Tank PPE (non-PCB)	MLLW	110 gal	TAN	INEEL CERCLA Storage Facility (ICDF) or Envirocare
3593	TAN PPE and incinerable debris (V-Tank associated = PCB contaminated	MLLW with PCBs	695 ft ³	TAN	ICDF or Envirocare
∞ 2576	TSF-21 Vault sampling materials and vault	MLLW	484 ft ³	TAN	Envirocare
2679	TSF-21 soils (IET valve pit) CERCLA	MLLW	512 ft ³	INTEC	ICDF or Envirocare
2902N	OU 1-10 TSF-18 Remedial Action waste (PPE and other debris from sampling activities)	MLLW	445 gal	TAN	ICDF or Envirocare

Table 4. Waste Stream Summary.

Remedial Action Activity	Waste Description	Location	Expected Type (MLLW, TSCA, IW, HW) and Applicable Waste Codes ^a	Estimated Volume	Storage Location	Planned Disposal
Remedial Action Waste						
Premobilization	Administrative waste		Industrial waste (IW)	TBD	TBD or soil bag/debris tank storage area	Central Facilities Area (CFA) Landfill
Tank Contents Removal	Sludge	V-1	MLLW with PCBs ≥ 50 ppm [F001, TSCA]	520 gal	Interim Sludge Storage Facility	ATG or another TSCA/RCRA compliant Treatment Storage Disposal Facility (TSDF)
	Sludge	V-2	MLLW with PCBs ≥ 50 ppm [D006, F001, TSCA]	520 gal	Interim Sludge Storage Facility	ATG or another TSCA/RCRA compliant TSDF
	Sludge	V-3	MLLW with PCBs ≥ 50 ppm [F001, TSCA]	652 gal	Interim Sludge Storage Facility	ATG or another TSCA/RCRA compliant TSDF
	Sludge	V-9	MLLW with PCBs ≥ 50 ppm [D006, D007, D008, D011, F001, TSCA]	250 gal	Interim Sludge Storage Facility	ATG or another TSCA/RCRA compliant TSDF
	Liquid waste	V-1	MLLW [D009, F001]	1164 gal	Drum Storage/Water Storage/Decontamination Area	INEEL CERCLA Disposal Facility (ICDF) or Envirocare ^b
	Liquid waste	V-2	MLLW [F001]	1076 gal	Drum Storage/Water Storage/Decontamination Area	ICDF or Envirocare ^b
	Liquid waste	V-3	MLLW [F001]	7647 gal	Drum Storage/Water Storage/Decontamination Area	ICDF or Envirocare ^b
	Liquid waste	V-9	MLLW [D006, D009, F001]	70 gal	Drum Storage/Water Storage/Decontamination Area	ICDF or Envirocare ^b

Table 4. (continued)

	Remedial Action Activity	Waste Description	Location	Expected Type (MLLW, TSCA, IW, HW) and Applicable Waste Codes ^a	Estimated Volume	Storage Location	Planned Disposal
10	Tank Excavation and Removal	Piping	V-1, V-2, V-3, V-9 piping	MLLW with PCBs ≥ 50 ppm [F001]	52 ft ³	Soil Bag/Debris/Tank Storage Area	Envirocare ^b or other approved facility
		Piping	Other V-1, V-2, V-3, V-9 piping that carried waste other than V-tank contents	Debris MLLW	27 ft ³	Soil Bag/Debris/Tank Storage Area	ICDF or Envirocare ^b
	Tank Excavation and Removal	Piping	Ancillary piping to the TAN-1704 Valve Box	MLLW with PCBs ≥ 50 ppm [F001]	1 ft ³	This VCO waste must be stored in a <90-day storage area or TSD	Managed by the VCO Program. Will not be placed, staged, or stored in any CERCLA WSA
		Underground storage tanks	V-1	MLLW with PCBs ^b [F001, D009]	1570 ft ³	Soil Bag/Debris/Tank Storage Area	ICDF or Envirocare ^b or other approved facility
		Underground storage tanks	V-2	MLLW with PCBs ^b [D006, F001]	1570 ft ³	Soil Bag/Debris/Tank Storage Area	ICDF or Envirocare ^b or other approved facility
		Underground storage tanks	V-3	MLLW with PCBs ^b [F001]	1570 ft ³	Soil Bag/Debris/Tank Storage Area	ICDF or Envirocare ^b or other approved facility
		Underground storage tanks	V-9	MLLW with PCBs ^b [D006, D007, D008, D009, D011, F001]	50 ft ³	Soil Bag/Debris/Tank Storage Area	ICDF or Envirocare ^b or other approved facility
		Concrete and sand filter structure	V-9 proximity	MLLW with PCBs ≥ 50 ppm ^b [F001]	22 ft ³	Drum Storage/Water Storage/ Decontamination Area	Envirocare, ATG or another TSCA/RCRA compliant TSDF ^b

Table 4. (continued)

	Remedial Action Activity	Waste Description	Location	Expected Type (MLLW, TSCA, IW, HW) and Applicable Waste Codes ^a	Estimated Volume	Storage Location	Planned Disposal
11		Sand Filter contents	V-9 proximity	MLLW with PCBs \geq 50 ppm ^b [F001]	0.7 ft ³	Sludge Interim Storage Facility	ATG or another TSCA/RCRA compliant TSDF ^b
		TAN-1704 valve box		MLLW [F001]	88 ft ³	This VCO waste must be stored in a <90-day storage area or BD	Managed by the VCO Program. Will not be placed, staged, or stored in any CERCLA WSA.
		TAN-1704, valve pit liquid		MLLW [F001]	200 gal	This VCO waste must be stored in a <90-day storage area or TSD	Managed by the VCO Program. Will not be placed, staged, or stored in any CERCLA WSA.
	Tank Excavation and Removal/Soil Remediation	Soil	Additional excavated soil	MLLW [F001]	2200 yd ^{3,c}	Soil Bag/Debris/Tank Storage Area	ICDF or other approved facility
		Soil	Soil around V-Tanks and pipes	MLLW [F001]	922 yd ^{3,c}	Soil Bag/Debris/Tank Storage Area	ICDF or other approved facility
Secondary waste streams ^d							
	Tank Contents Removal, Tank Excavation and Removal	Storm Water		MLLW, HW, and/or TSCA or CIW Waste codes TBD	15,000 gal ^e	Drum Storage/Water Storage/Decontamination Area	ICDF or other approved facility
	Tank contents removal, tank excavation and removal, decontamination, soil remediation	Personal protective equipment (PPE)		MLLW and/or TSCA or CIW Waste codes TBD	350 ft ^{3,f}	Soil Bag/Debris/Tank Storage Area	ICDF or other approved facility

Table 4. (continued)

Remedial Action Activity	Waste Description	Location	Expected Type (MLLW, TSCA, IW, HW) and Applicable Waste Codes ^a	Estimated Volume	Storage Location	Planned Disposal
Decontamination	Decontamination water		MLLW and/or TSCA or CIW Waste codes TBD	2500 gal ^g	Drum Storage/Water Storage/Decontamination Area	ICDF or other approved facility
Tank Contents Removal	Pumps/hoses/lances/valves		MLLW and/or TSCA or CIW Waste codes TBD	TBD	Drum Storage/Water Storage/Decontamination Area	ICDF or other approved facility
	Granulated activated carbon		MLLW and/or TSCA [F001]	TBD	Drum Storage/Water Storage/Decontamination Area	ICDF or other approved facility
	Contaminated drums/HICs/tanks		LLW, MLLW and/or TSCA [F001 or managed as empty containers]	TBD	High-Integrity Container (HIC) Storage/Drum Filling/Staging Area or Drum Storage/Water Storage/Decontamination Area	ICDF or other approved facility
	Sandbags		MLLW and/or TSCA or IW Waste codes TBD	TBD	Drum Storage/Water Storage/Decontamination Area	ICDF or other approved facility
	Secondary containment structures (glove bags)		MLLW and/or TSCA or IW Waste codes TBD	TBD	Drum Storage/Water Storage/Decontamination Area	ICDF or other approved facility
	Trash		IW	50 yd ³	Soil Bags/Debris/Tank Storage Area	CFA Landfill
	Filters		MLLW and/or TSCA [F001]	TBD	Drum Storage/Water Storage/Decontamination Area	ICDF or other approved facility
	Wire and bristle brushes, buckets, tubs, rags/towels, spray bottles		MLLW and/or TSCA or CIW Waste codes TBD	TBD	Drum Storage/Water Storage/Decontamination Area	ICDF or other approved facility

Table 4. (continued)

Remedial Action Activity	Waste Description	Location	Expected Type (MLLW, TSCA, IW, HW) and Applicable Waste Codes ^a	Estimated Volume	Storage Location	Planned Disposal
	Tarps/plastic sheeting		MLLW and/or TSCA or CIW Waste codes TBD	TBD	Drum Storage/Water Storage/ Decontamination Area	ICDF or other approved facility
	Control platforms		MLLW and/or TSCA or CIW Waste codes TBD	TBD	Drum Storage/Water Storage/ Decontamination Area	ICDF or other approved facility

a. Characterization of a given waste stream was based on past analytical data and process knowledge and will be further supported by waste profile information that is currently being prepared by Waste Generator Service (WGS). RCRA waste codes provided for wastes are preliminary and will be updated as the waste profiles are prepared.

b. Analytical results for the V-tank liquid report the PCB concentration < 50 ppm. During sludge and liquid removal activities the sludge (containing PCBs > 50 ppm) and the liquid may mix, resulting in concentrations of PCBs > 50 ppm. All of the V-tank liquid will be passed through a treatment process after dewatering to meet LDRs and WAC. The V-tanks, Piping and Sand Filter structure are assumed to be contaminated with PCBs > 50 ppm and RCRA listed waste. The V-tanks, piping and sand filter concrete will be packaged and managed as CERCLA remediation waste debris. Both ICDF and Envirocare can accept LDR-compliant CERCLA remediation waste. Sand filter contents are also assumed to be contaminated with PCBs > 50 ppm and radiological components, and will be sent to an appropriate facility.

c. The basis for the estimated soil volume to be removed during remediation is based on the following assumptions: 1) In the area of excavation (1,248 ft³), soil will be excavated to 2 ft below the tank bottom; 2) in the contaminated soil area (4,000 ft³), the soil will be excavated to 2 ft; and 3) and in the remainder of the fenced area (53,000 ft³), the soil will be excavated to 1 ft.

d. TBD – The disposition of these waste streams will be based on a hazardous waste determination, and depending on the outcome may be disposed of on-Site or off-Site.

e. The volume of estimated storm water is based on past rainfall data and engineering estimates.

f. The basis for the additional estimated volume of personal protective equipment (PPE) expected is based on experience at previous remedial actions.

g. The basis for the estimated volume of decontamination water is based on past experience, an evaluation of the equipment that may require wet decontamination, and an effort to use dry decontamination methods whenever possible.

